# 4058

## Medium-Mu Triode

GLASS-METAL PENCIL TYPE

*For Use at Frequencies Up to 4000 Mc/s in Pulse Service and 2000 Mc/s in CW Service*

### ELECTRICAL

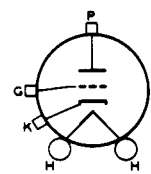
| | | |
|---|---|---|
| **Heater, for Unipotential Cathode** | | |
| Voltage (AC or DC): | | |
| Under transmitting conditions | 6.0 ± 10% | V |
| Under standby conditions | 6.3 max | V |
| Current at 6.0 V | 0.300 | A |
| **Amplification Factor** | 40 | |
| **Transconductance** | 7300 | μmhos |
| for dc plate current of 22 mA and dc plate voltage of 200 V | | |
| **Direct Interelectrode Capacitances (Approx.)** | | |
| Grid to plate | 1.8 | pF |
| Grid to cathode | 3.2 | pF |
| Plate to cathode | 0.07 max | pF |

### MECHANICAL

| | |
|---|---|
| **Operating Position** | Any |
| **Dimensions and Terminal Connections** | See *Dimensional Outline* |
| **Plate Seal Temperature** | 175 max °C |
| **Weight (Approx.)** | 0.4 oz |
| **Sockets** | |
| Heater terminals connector | Grayhill No. 22-3[a] |

### TERMINAL CONNECTIONS (See *Dimensional Outline*)

H – Heater
K – Cathode (Cylinder adjacent to heater pins)
G – Grid (Flange between glass sections)
P – Plate (Cylinder adjacent to pinch-off)




### PLATE-PULSED OSCILLATOR[b]—CLASS C

**Maximum CCS[c] Ratings, Absolute-Maximum Values**

*For a maximum "ON" time[d] of 5 microseconds in any 500-microsecond interval.*

*For altitudes up to 30,000 feet*

| | *Up to 4000 Mc/s* | |
|---|---|---|
| **Peak Positive-Pulse Plate-Supply Voltage[e]** | 2000 | V |
| **Peak Grid-Bias Voltage** | | |
| Negative pulse | 150 | V |
| Positive pulse | 25 | V |
| **Peak Plate Current** | 3 | A |
| From pulse supply | | |
| **Peak Rectified Grid Current** | 1.5 | A |
| **DC Plate Current** | 0.03 | A |

| | Up to 4000 Mc/s | |
|---|---|---|
| DC Grid Current | 0.013 | A |
| Plate Dissipation[f] | 7 | W |
| Pulse Duration | 5 | μs |

**Typical Operation with Rectangular Wave Shape in Cathode-Drive Circuit at 3300 Mc/s**

*With duty factor[g] of 0.01 and pulse duration of 1 microsecond*

| | | |
|---|---|---|
| Peak Positive-Pulse Plate-Supply Voltage[e] | 1750 | V |
| Peak Negative-Pulse | | |
| Grid-bias voltage | 110 | V |
| From grid resistor of | 100 | Ω |
| Peak Plate Current | 3 | A |
| From pulse supply | | |
| Peak Rectified Grid Current | 1.1 | A |
| DC Plate Current | 0.03 | A |
| DC Grid Current | 0.011 | A |
| Useful Power Output | 800 | W |
| At peak of pulse[h] (approx.) | | |

## RF POWER AMPLIFIER AND OSCILLATOR—CLASS C TELEGRAPHY

*Key-down conditions per tube without amplitude modulation*[j]

**Absolute-Maximum Ratings**

*For altitudes up to 60,000 feet*

| | CCS | ICAS[k] | |
|---|---|---|---|
| DC Plate Voltage | 330 | 400 | V |
| DC Grid Voltage | -100 | -100 | V |
| DC Plate Current | 40 | 55 | mA |
| DC Grid Current | 25 | 25 | mA |
| DC Cathode Current | 55 | 70 | mA |
| Plate Input | 13.2 | 22 | W |
| Plate Dissipation | 8 | 13 | W |
| Peak Heater-Cathode Voltage: | | | |
| Heater negative with respect to cathode | 50 | 50 | W |
| Heater positive with respect to cathode | 50 | 50 | W |

**Typical Operation as Oscillator in Cathode-Drive Circuit at 500 Mc/s**

| | CCS | ICAS | |
|---|---|---|---|
| DC Plate-to-Grid Voltage | 325 | 380 | V |
| DC Cathode-to-Grid Voltage[m] | 25 | 30 | V |
| DC Plate Current | 35 | 35 | mA |
| DC Grid Current (Approx.) | 11 | 13 | mA |
| Useful Power Output (Approx.) | 5[n] | 6[n] | W |

**Typical Operation as Oscillator in Cathode-Drive Circuit at 1700 Mc/s**

| | CCS | |
|---|---|---|
| DC Plate-to-Grid Voltage[m] | 263 | V |
| DC Cathode-to-Grid Voltage | 13 | V |
| DC Plate Current | 40 | mA |
| DC Grid Current (Approx.) | 13 | mA |
| Useful Power Output (Approx.) | 1[n] | W |



RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

**Typical Operation as RF Power Amplifier in Cathode-Drive Circuit at 500 Mc/s**

| | *CCS* | *ICAS* | |
|---|---|---|---|
| DC Plate-to-Grid Voltage | 342 | 395 | V |
| DC Cathode-to-Grid Voltage[m] | 42 | 45 | V |
| DC Plate Current | 35 | 40 | mA |
| DC Grid Current (Approx.) | 13 | 15 | mA |
| Driver Power Output (Approx.) | 2.4 | 3 | W |
| Useful Power Output (Approx.) | 7.5[n] | 10[n] | W |

**Maximum Circuit Values**

| | | | |
|---|---|---|---|
| Grid-Circuit Resistance | 0.1 | 0.1 | MΩ |

## FREQUENCY MULTIPLIER

**Absolute-Maximum Ratings**

*For altitudes up to 60,000 feet*

| | *CCS* | *ICAS*[k] | |
|---|---|---|---|
| DC Plate Voltage | 300 | 350 | V |
| DC Grid Voltage | -125 | -140 | V |
| DC Plate Current | 33 | 45 | mA |
| DC Grid Current | 25 | 25 | mA |
| DC Cathode Current | 45 | 55 | mA |
| Plate Input | 9.9 | 15.9 | W |
| Plate Dissipation | 6 | 9.5 | W |
| Peak Heater-Cathode Voltage: | | | |
| Heater negative with respect to cathode | 50 | 50 | V |
| Heater positive with respect to cathode | 50 | 50 | V |

**Typical Operation as Tripler to 510 Mc/s in Cathode-Drive Circuit**

| | *CCS* | *ICAS* | |
|---|---|---|---|
| DC Plate-to-Grid Voltage | 410 | 472 | V |
| DC Cathode-to-Grid Voltage[m] | 110 | 122 | V |
| DC Plate Current | 26 | 36.5 | mA |
| DC Grid Current (Approx.) | 4.1 | 5.8 | mA |
| Driver Power Output (Approx.) | 2.75 | 4.5 | W |
| Useful Power Output (Approx.) | 2.1[n] | 3.4[n] | W |

**Maximum Circuit Values**

| | | | |
|---|---|---|---|
| Grid-Circuit Resistance | 0.1 | 0.1 | MΩ |

[a] Grayhill Inc., 561 Hillgrove Ave., LaGrange, Ill.

[b] In this class of service, the heater should be allowed to warm up for a minimum of 60 seconds before plate voltage is applied.

[c] Continuous Commercial Service.

[d] "ON" time is defined as the sum of the duration of all individual pulses which occur during the indicated interval. *Pulse duration* is defined as the time interval between the two points on the pulse at which the instantaneous value is 70% of the peak power value. The *peak value* is defined as the maximum value of a smooth curve through the average of the fluctuations over the top portion of the pulse.

[e] The magnitude of any spike on the plate voltage pulse should not exceed a value of 2000 volts with respect to cathode and its duration should not exceed 0.01 microsecond measured at the peak-pulse-value level.

[f] In applications where the plate dissipation exceeds 3 watts, it is important that a large area of contact be provided between the plate cylinder and the connector in order to provide adequate heat conduction.

g Duty factor is the product of pulse duration and repetition rate. For variable pulse durations and pulse repetition rates, the duty factor is defined as the ratio of time "ON" to total elapsed time in any 500-microsecond interval.

h The power output at peak of pulse is obtained from the average power output using the duty factor of the peak pulse. This procedure is necessary since the power output pulse duty factor may be less than the applied voltage pulse duty factor because of a delay in the start of rf power output.

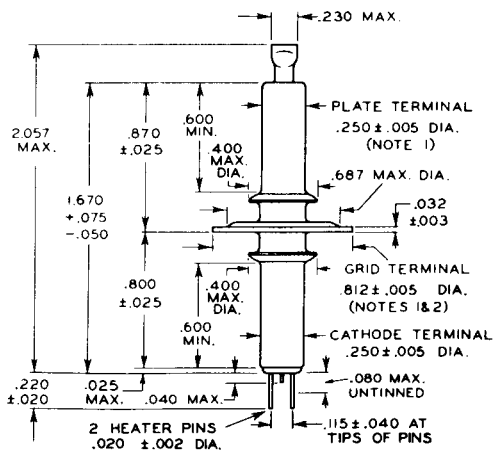
j Modulation, essentially negative, may be used if the positive peak of the audio-frequency envelope does not exceed 115 percent of the carrier conditions.

k Intermittent Commercial and Amateur Service.

m From a grid resistor, or from a suitable combination of grid resistor and fixed supply or grid resistor and cathode resistor.

n This value of useful power is measured at load of output circuit having an efficiency of about 75 percent.

## DIMENSIONAL OUTLINE




DIMENSIONS IN INCHES

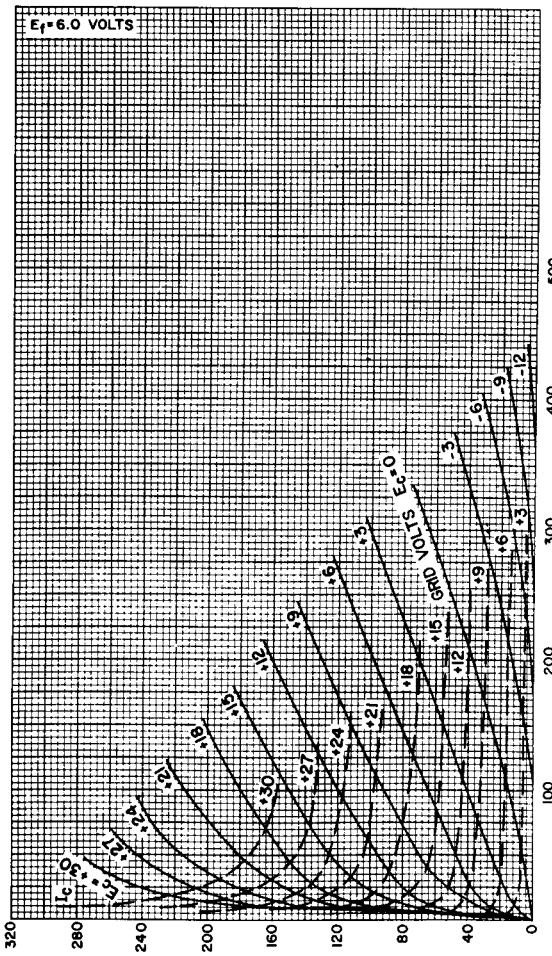
**Note 1:** Max. eccentricity of center line (Axis) of plate terminal or grid-terminal flange with respect to the center line (Axis) of the cathode terminal is 0.010 inch.

**Note 2:** Tilt of grid-terminal flange with respect to rotational axis of cathode terminal is determined by chucking the cathode terminal, rotating the tube, and gauging the total travel distance of the grid-terminal flange parallel to the axis of a point approximately 0.020 inch inward from its edge for one complete rotation. The total travel distance will not exceed 0.020 inch.

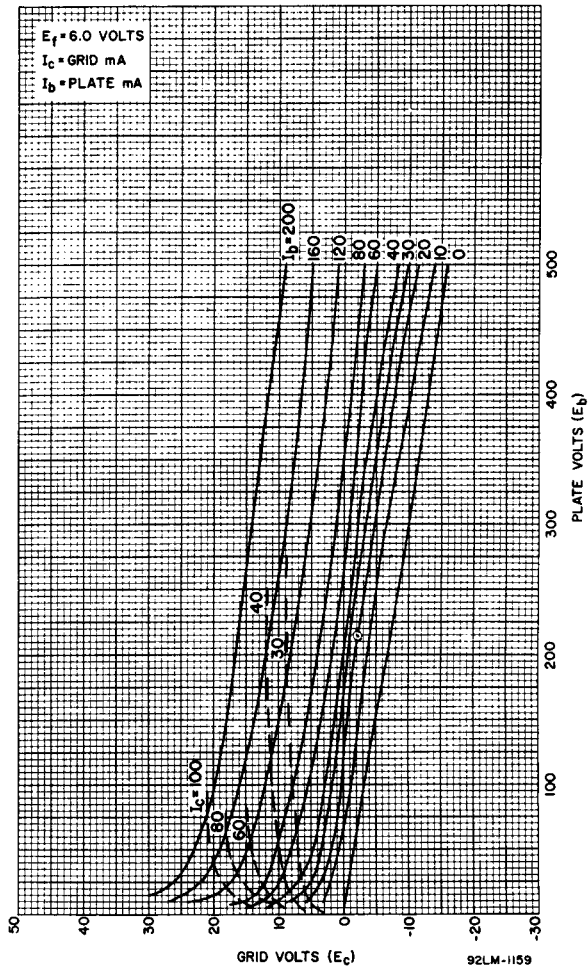


RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

## Average Plate Characteristics



## Average Constant-Current Characteristics






RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.